

# HAT2085T

Silicon N Channel MOS FET  
High Speed Power Switching

REJ03G0163-0500

Rev.5.00

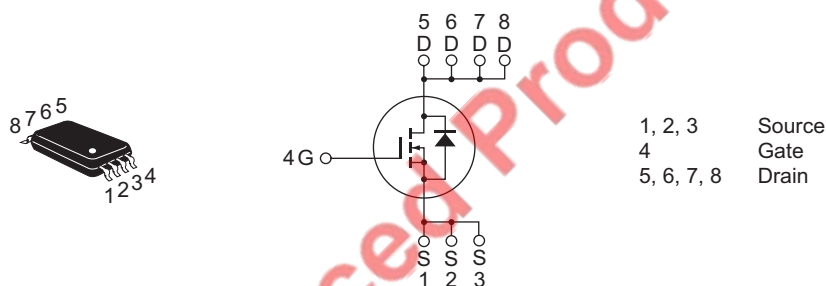
Nov 27, 2007

## Features

- Low on-resistance
- Low drive current
- High density mounting

## Outline

RENESAS Package code: PTSP0008JB-B  
(Package name: TSSOP-8 <TTP-8DV> )



## Absolute Maximum Ratings

(Ta = 25°C)

Item	Symbol	Value	Unit
Drain to source voltage	$V_{DSS}$	200	V
Gate to source voltage	$V_{GSS}$	$\pm 30$	V
Drain current	$I_D$	1.4	A
Drain peak current	$I_{D(pulse)}$ <sup>Note 1</sup>	11.2	A
Body to drain diode reverse drain current	$I_{DR}$	1.4	A
Channel dissipation	$P_{ch}$ <sup>Note 2</sup>	1.3	W
Channel temperature	$T_{ch}$	150	°C
Storage temperature	$T_{stg}$	-55 to +150	°C

Notes: 1.  $PW \leq 10 \mu s$ , duty cycle  $\leq 1\%$

2. When using the glass epoxy board (FR4 40 × 40 × 1.6 mm),  $PW \leq 10 s$

## Electrical Characteristics

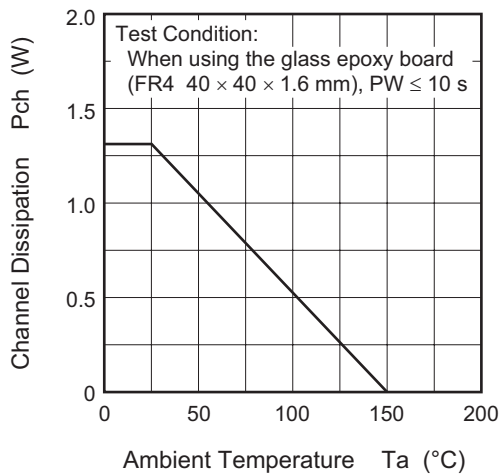
(Ta = 25°C)

Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	200	—	—	V	$I_D = 10 \text{ mA}$ , $V_{GS} = 0$
Gate to source leak current	$I_{GSS}$	—	—	$\pm 0.1$	$\mu\text{A}$	$V_{GS} = \pm 30 \text{ V}$ , $V_{DS} = 0$
Zero gate voltage drain current	$I_{DSS}$	—	—	1	$\mu\text{A}$	$V_{DS} = 200 \text{ V}$ , $V_{GS} = 0$
Gate to source cutoff voltage	$V_{GS(off)}$	3.0	—	4.5	V	$I_D = 1 \text{ mA}$ , $V_{DS} = 10 \text{ V}$
Static drain to source on state resistance	$R_{DS(on)}$	—	0.49	0.64	$\Omega$	$I_D = 0.7 \text{ A}$ , $V_{GS} = 10 \text{ V}$ <sup>Note 3</sup>
Forward transfer admittance	$ y_{fs} $	1.0	1.7	—	S	$I_D = 0.7 \text{ A}$ , $V_{DS} = 10 \text{ V}$ <sup>Note 3</sup>
Input capacitance	$C_{iss}$	—	300	—	pF	$V_{DS} = 25 \text{ V}$ $V_{GS} = 0$ $f = 1 \text{ MHz}$
Output capacitance	$C_{oss}$	—	43	—	pF	
Reverse transfer capacitance	$C_{rss}$	—	12	—	pF	
Turn-on delay time	$t_{d(on)}$	—	21	—	ns	$V_{DD} \cong 100 \text{ V}$ , $I_D = 0.7 \text{ A}$ $V_{GS} = 10 \text{ V}$ $R_L = 143 \Omega$ $R_g = 10 \Omega$
Rise time	$t_r$	—	11	—	ns	
Turn-off delay time	$t_{d(off)}$	—	48	—	ns	
Fall time	$t_f$	—	18	—	ns	
Total gate charge	$Q_g$	—	10	—	nC	$V_{DD} = 160 \text{ V}$ $V_{GS} = 10 \text{ V}$ $I_D = 1.4 \text{ A}$
Gate to source charge	$Q_{gs}$	—	1.8	—	nC	
Gate to drain charge	$Q_{gd}$	—	4.8	—	nC	
Body to drain diode forward voltage	$V_{DF}$	—	0.8	1.2	V	$I_F = 1.4 \text{ A}$ , $V_{GS} = 0$ <sup>Note 3</sup>
Body to drain diode reverse recovery time	$t_{rr}$	—	65	—	ns	$I_F = 1.4 \text{ A}$ , $V_{GS} = 0$ $di_F/dt = 100 \text{ A}/\mu\text{s}$

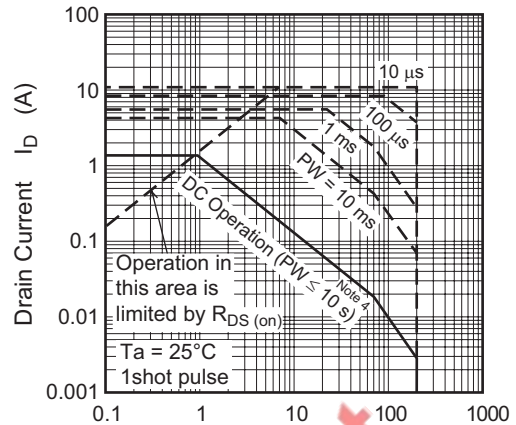
Note: 3. Pulse test

## Main Characteristics

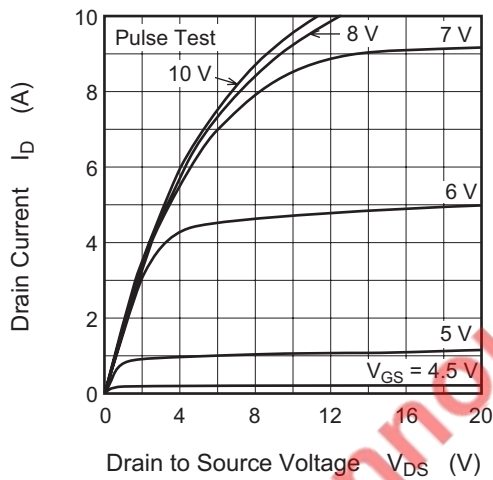
Power vs. Temperature Derating



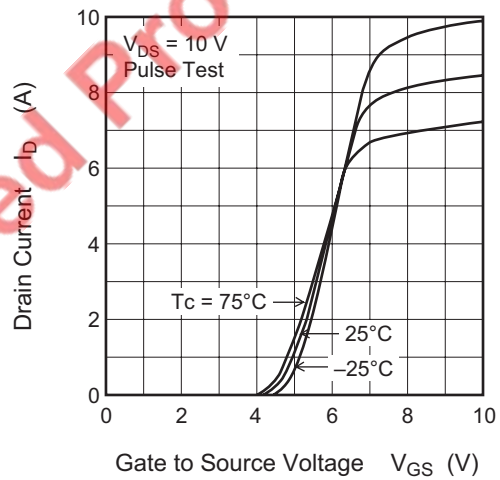
Maximum Safe Operation Area



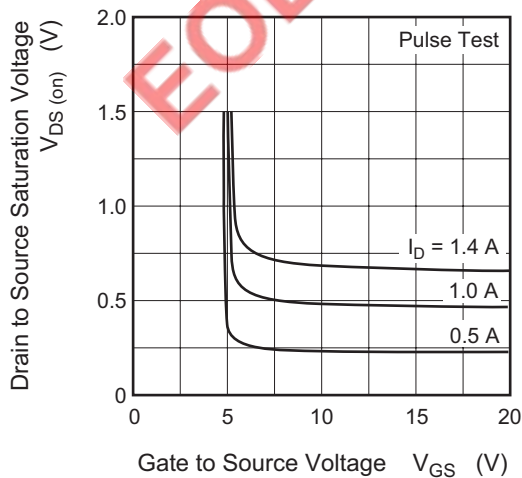
Typical Output Characteristics



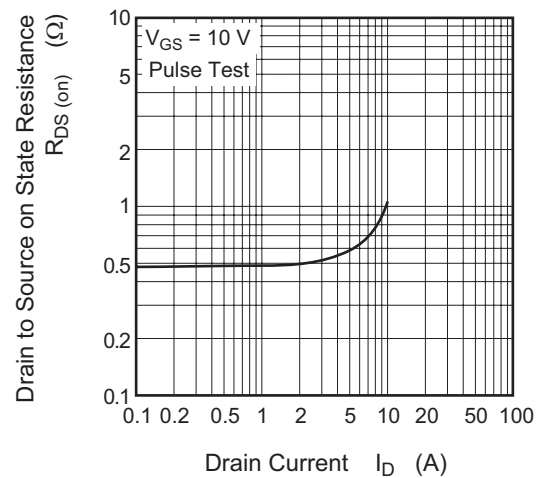
Typical Transfer Characteristics



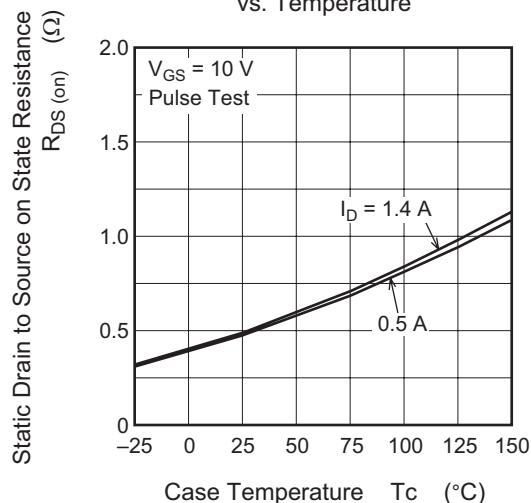
Drain to Source Saturation Voltage vs. Gate to Source Voltage



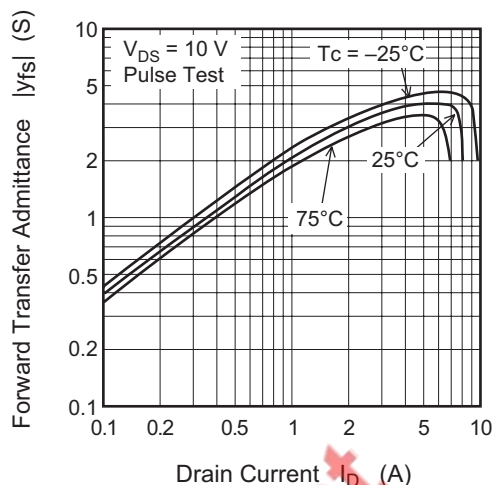
Static Drain to Source on State Resistance vs. Drain Current



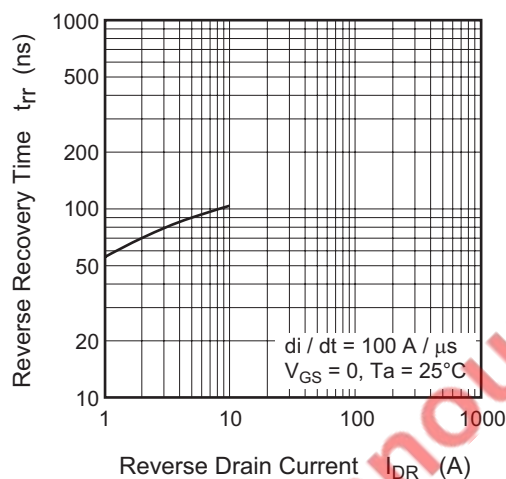
Static Drain to Source on State Resistance vs. Temperature



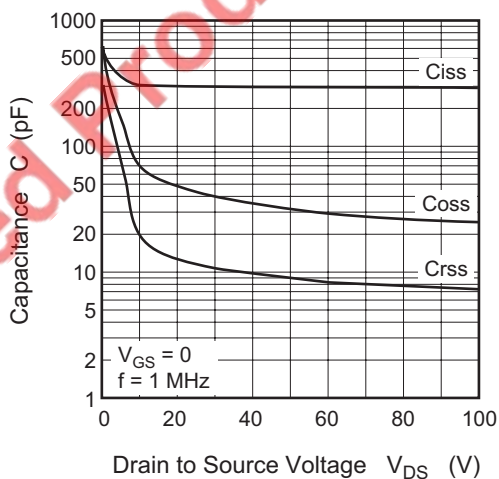
Forward Transfer Admittance vs. Drain Current



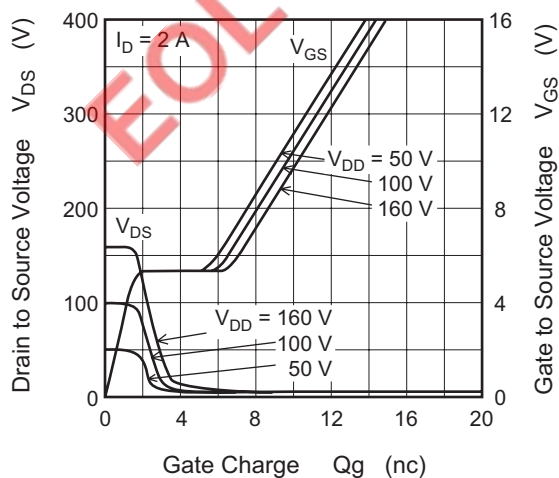
Body to Drain Diode Reverse Recovery Time



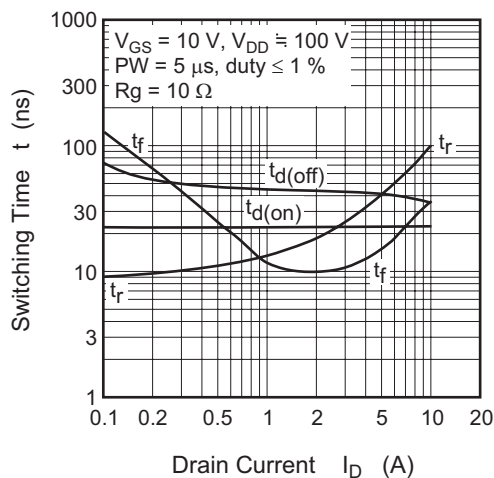
Typical Capacitance vs. Drain to Source Voltage

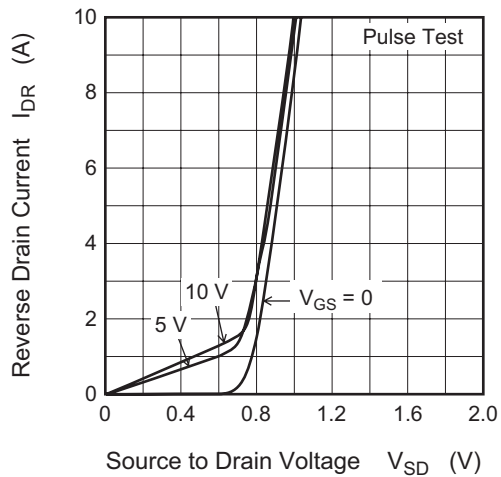
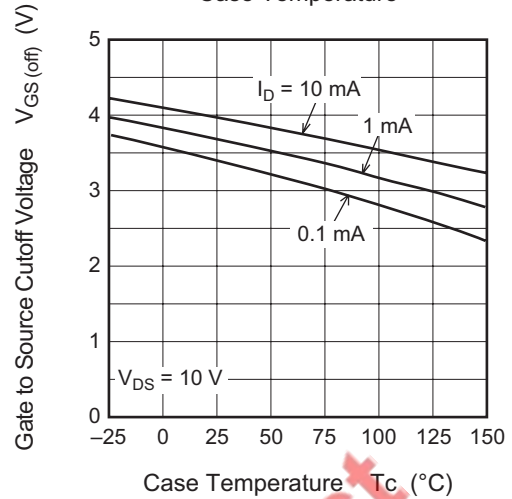


Dynamic Input Characteristics

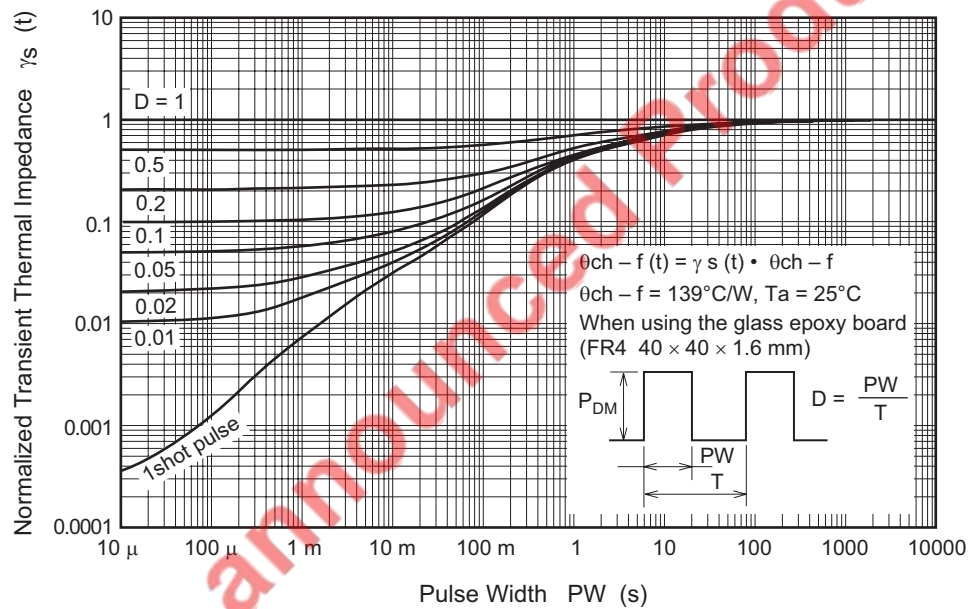


Switching Characteristics

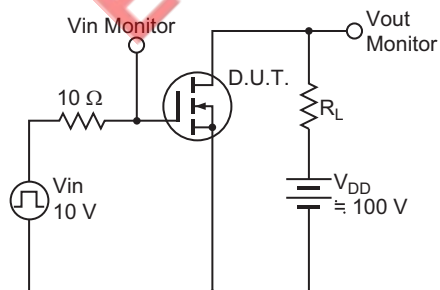


Reverse Drain Current vs.  
Source to Drain VoltageGate to Source Cutoff Voltage vs.  
Case Temperature

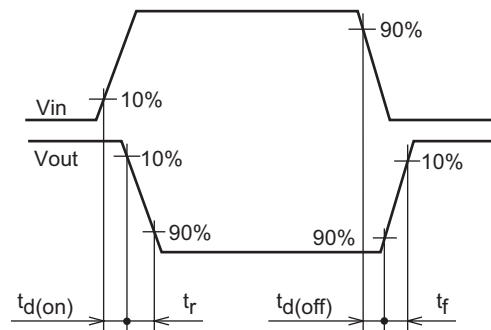
Normalized Transient Thermal Impedance vs. Pulse Width



Switching Time Test Circuit

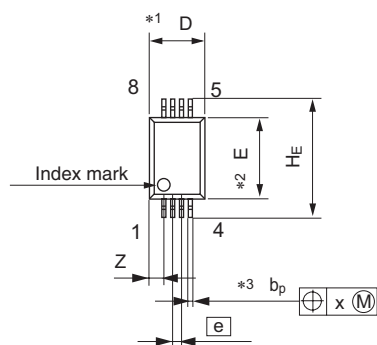


Switching Time Waveform



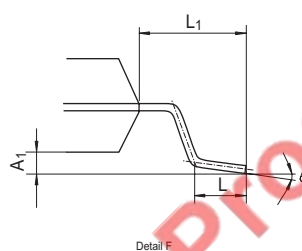
## Package Dimensions

Package Name	JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]
TSSOP-8	P-TSSOP8-4.4 × 3-0.65	PTSP0008JB-B	TTP-8DV	0.037g



Terminal cross section  
(Ni/Pd/Au plating)

NOTE)  
1. DIMENSIONS "\*1(Nom)" AND "\*2"  
DO NOT INCLUDE MOLD FLASH.  
2. DIMENSION "\*3" DOES NOT  
INCLUDE TRIM OFFSET.



Detail F

Reference Symbol	Dimension in Millimeters		
	Min	Nom	Max
D	—	3.00	3.30
E	—	4.40	—
A <sub>2</sub>	—	—	—
A <sub>1</sub>	0.03	0.07	0.10
A	—	—	1.10
b <sub>p</sub>	0.15	0.20	0.25
b <sub>1</sub>	—	—	—
c	0.10	0.15	0.20
c <sub>1</sub>	—	—	—
θ	0°	—	8°
H <sub>E</sub>	6.20	6.40	6.60
e	—	0.65	—
x	—	—	0.13
y	—	—	0.10
Z	—	—	0.805
L	0.40	0.50	0.60
L <sub>1</sub>	—	1.0	—

## Ordering Information

Part No.	Quantity	Shipping Container
HAT2085T-EL-E	3000 pcs	Taping

Notes:

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